

Claims

1. An apparatus for processing a document traveling along a document path within a document validator, such apparatus comprising:

a disk where a periphery of the disk extends into the document path of the document validator;

a support shaft that passes through a center hole of the disk, the shaft loosely supporting the disk and allowing the disk to rotate around the shaft in a predominant plane of the disk and to freely move in the predominant plane of the disk in a direction that is perpendicular to a longitudinal axis of the shaft; and

a resilient member that biases the disk into the document path to engage a side edge of the document when the document is misaligned with the document path as it travels along the document path thereby retarding forward movement of the side edge and rotation of the document into alignment with the document path.

2. The apparatus for processing a document as in claim 1 wherein loosely supported further comprises defining the center hole of the disk as being at least twice as large as a diameter of the support shaft.

3. The apparatus for processing a document as in claim 1 further comprising the periphery of the disk extending through the document path in the absence of the document.

4. The apparatus for processing a document as in claim 1 wherein the disk further comprises a collar disposed around the center hole of the disk.

5. The apparatus for processing a document as in claim 4 wherein the resilient member further comprises a leaf spring that engages the collar on a first end and that extends rearward of the disk along the document path to a support member.
6. The apparatus for processing a document as in claim 5 wherein the disk further comprises a plurality of disks and a plurality of leaf springs where each leaf spring of the plurality of leaf springs engages a respective disk of the plurality of disks.
7. The apparatus for processing a document as in claim 6 wherein the plurality of leaf springs further comprises a spring assembly.
8. The apparatus for processing a document as in claim 7 wherein the spring assembly further comprises a comb shape.
9. The apparatus for processing a document as in claim 8 wherein each leaf spring of the spring assembly further comprises a hook on an engagement end of the leaf spring to limit a forward travel of a corresponding disk.

10. The apparatus for processing a document as in claim 9 wherein each spring of the spring assembly further comprises a straight portion between the hook and base member that allows a corresponding disk to move rearward towards the support member of the spring assembly as the disk interacts with the document resulting in a nonlinear downward force on the disk due to a shortened effective length of the leaf spring.

11. An apparatus for processing a document traveling along a document path in a document validator, such apparatus comprising:

a disk where a periphery of the disk extends into the document path of the document validator;

a support shaft that extends through a center hold of the disk, that loosely supports the disk and that allows the disk to freely move in a direction that is perpendicular to a longitudinal axis of the shaft; and

a resilient member that biases the disk into the document path and applies a nonlinear force against the disk based upon a displacement of the disk in a direction of travel of the document.

12. The apparatus for processing a document as in claim 11 wherein the disk extends through the document path to engage a side edge of the document when the document is misaligned with the document path as it travels along the document path thereby retarding forward movement of the side edge and rotation of the document into alignment with the document path.

13. The apparatus for processing a document as in claim 11 wherein loosely supported further comprises defining the center hole of the disk as being at least twice as large as a diameter of the support shaft.

14. The apparatus for processing a document as in claim 11 wherein the disk further comprises a collar disposed around the center hole of the disk.

15. The apparatus for processing a document as in claim 14 wherein the resilient member further comprises a leaf spring that engages the collar on a first end and that extends rearward of the disk along the document path to a support member.

16. The apparatus for processing a document as in claim 15 wherein the disk further comprises a plurality of disks and a plurality of leaf springs where each leaf spring of the plurality of leaf springs engages a respective disk of the plurality of disks.

17. The apparatus for processing a document as in claim 16 wherein the plurality of leaf springs further comprises a spring assembly.

18. The apparatus for processing a document as in claim 17 wherein the spring assembly further comprises a comb shape.

19. The apparatus for processing a document as in claim 18 wherein each leaf spring of the spring assembly further comprises a hook on an engagement end of the leaf spring to limit a forward travel of a corresponding disk.

20. The apparatus for processing a document as in claim 19 wherein each spring of the spring assembly further comprises a straight portion between the hook and base member that allows a corresponding disk to move rearward towards the support member of the spring assembly as the disk interacts with the document resulting in a nonlinear downward force on the disk due to a shortened effective length of the leaf spring.

21. An apparatus for aligning a document with a document path in a document validator, such apparatus comprising:

a plurality of disks where a periphery of each disk of the plurality of disks extends into the document path of the document validator, said disks each having a center hole;

a support shaft that loosely supports the disks, said support shaft having a diameter that is approximately one-half the diameter of the center hole of the disks; and

a resilient member that biases the disks into the document path.